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EXAMINER

RAO, ANAND SHASHIKANT

ART UNIT PAPER NUMBER

2621

DATE MAILED: 05/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/658,131

Applicant(s)

SCHOENBLUM, JOEL W.

Examiner

Andy S. Rao

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-51 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-7,9-15,17,26-32,34-40,42 and 51 is/are rejected.
- 7) ☒ Claim(s) 8,16,18-25,33,41 and 43-50 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 6/2/05.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

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DETAILED ACTION

Specification

1. The specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-7, 9-11, 17, 26-32, 34-36, 42 and 51 are rejected under 35 U.S.C. 102(b) as being anticipated by Reininger et al., (hereinafter referred to as "Reininger").

Reininger discloses a method of transcoding a digital stream of compressed frames (Reininger: figures 3 and 8, the method comprising the steps of: receiving a compressed video frame having content information and non- content information included therein (Reininger: column 8, lines 20-30); determining the total compressed size of the frame (N_T) (Reininger: column 3, lines 5-18); determining from at least the total compressed size of the frame the total number of bits (N_S) to shave from the compressed frame (Reininger: column 5, lines 5-15); determining a plurality of statistics about a given portion of the frame (Reininger: column 3, lines 20-25 and 45-67); determining whether to requantize the given portion based at least in part upon at least one of the statistics about the given portion (Reininger; column 4, lines 3-10);

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responsive to determining to requantize the given portion, requantizing the levels of the given portion (Reininger: column 4, lines 10-15); determining whether to threshold the given portion based at least in part on the at least one of the statistics about the given portion (Reininger: column 4, lines 16-24); responsive to determining to threshold the given portion, thresholding the levels of the given portion (Reininger: column 4, lines 50-67); and transmitting the given portion (Reininger: column 6, lines 55-60), as in claim 1.

Regarding claim 2, Reininger discloses decompressing the video frame into a DCT domain, wherein in the DCT-domain blocks of pixel information are represented as blocks of levels (Reininger: column 6, lines 35-40); parsing the frame into a plurality of portions (Reininger: column 2, lines 47-67); and prior to step, re-compressing the given portion, wherein the given transmitted in step is the re-compressed given portion (Reininger: column 8, lines 20-55).

Regarding claim 3, Reininger discloses that the plurality of statistics about the given portion include the compressed content size (S_{size}) of the given portion (Reininger: column 3, lines 55-60), as in the claim.

Regarding claim 4, Reininger discloses that the plurality of statistics about the given portion include the average of the quantization parameters used to quantize the levels of the given portion (Reininger: column 8, lines 65-67; column 9, lines 1-7), as in the claim.

Regarding claim 5, Reininger discloses that the plurality of statistics about the given portion include the average of the runs in the given portion (Reininger: column 6, lines 64-67; column 7, lines 1-27), as in the claim.

Regarding claim 6, Reininger discloses determining the initial compressed content size (S_{int}) of the given portion (Reininger: column 3, lines 45-67); prior to the step, determining a target number of bits to shave (N_{shave}) from the given portion (Reininger: column 5, lines 5-15); prior to the step, determining the final compressed content size (S_{fml}) of the given portion (Reininger: column 4, lines 10-15); and calculating the reduction error for the given portion (Reininger: column 3, lines 50-55), wherein the reduction error is defined as the difference between the target number of bits to shave and the difference between final and initial compressed content size (Reininger: column 5, lines 1-10), $e = N_{shave} - (S_{fml} - S_{int})$.

Regarding claim 7, Reininger discloses accumulating the reduction error, wherein the accumulated reduction error is used in determining the number of bits to shave frame a subsequent portion of the frame (Reininger: column 5, lines 1-10), as in the claim.

Regarding claim 9, Reininger discloses re-determining at least one of the statistics of the given portion, wherein the at least one re-determined statistics about the given portion is used in step (Reininger: column 4, lines 45-67), as in the claim.

Regarding claim 10, Reininger discloses wherein the determined statistics include the compressed content size (S_{size}) of the given portion, and the compressed content size is re-determined after the given portion has been requantized.

Regarding claim 11, Reininger discloses determining a requantization parameter for the given portion based at least upon one of the determined statistics about the given portion (Reininger: column 4, lines 25-55), as in the claim.

Regarding claim 17, Reininger discloses determining the picture type of the video frame, wherein the video frame is an MPEG frame, and the group of picture types of I, P, B pictures,

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wherein the picture type of video frame is used in determining the requantization parameter (Reininger: column 2, lines 35-45; column 3, lines 1-10), as in the claim.

Regarding claim 26, Reininger discloses wherein the given portion of the frame is a slice of the frame having multiple blocks of levels (Reininger: column 2, lines 55-60), and the blocks of levels are thresholded in parallel (Reininger: column 9, lines 5-25), as in the claim.

Reininger discloses an apparatus in a network for transcoding a digital stream of compressed frames (Reininger: figure 2), the apparatus comprising: a decoder adapted to decompress a video frame having content information and non-content information included therein (Reininger: column 8, lines 20-30) into the DCT-domain (Reininger: column 7, lines 10-20), wherein the content-information carried by the frame is represented as levels in the DCT-domain (Reininger: column 8, lines 45-65); a rate controller adapted to receive the video frame, parse the video frame into a plurality of portions (Reininger: column 8, lines 15-25), determine a plurality of statistics about a given portion (Reininger: column 3, lines 20-25 and 45-67), and determine a target number of bits (N_s) to shave from the given portion (Reininger: column 5, lines 5-15); a requantizer adapted to requantize levels of the given portion (Reininger: column 4, lines 10-15); a thresholder adapted to threshold the given portion (Reininger: column 4, lines 50-67), wherein the rate controller determines whether the given portion should be requantized and whether the given portion should be thresholded based at least in part on at least one of the statistics about the given portion (Reininger: column 4, lines 3-10); and an encoder adapted to compress the frame (Reininger: column 6, lines 25-50), wherein the compressed size of the frame is approximately the same as a target size (Reininger: column 7, lines 10-55), as in claim 27.

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Regarding claim 28, Reininger discloses that the plurality of statistics about the given portion include the compressed content size (S_{size}) of the given portion (Reininger: column 3, lines 55-60), as in the claim.

Regarding claim 29, Reininger discloses that the plurality of statistics about the given portion include the average of the quantization parameters used to quantize the levels of the given portion (Reininger: column 8, lines 65-67; column 9, lines 1-7), as in the claim.

Regarding claim 30, Reininger discloses that the plurality of statistics about the given portion include the maximum quantization parameter in the given portion (Reininger: column 6, lines 64-67; column 7, lines 1-27), as in the claim.

Regarding claim 31, Reininger discloses determining the initial compressed content size (S_{int}) of the given portion (Reininger: column 3, lines 45-67); prior to the step, determining a target number of bits to shave (N_{shave}) from the given portion (Reininger: column 5, lines 5-15); prior to the step, determining the final compressed content size (S_{fml}) of the given portion (Reininger: column 4, lines 10-15); and calculating the reduction error for the given portion (Reininger: column 3, lines 50-55), wherein the reduction error is defined as the difference between the target number of bits to shave and the difference between final and initial compressed content size (Reininger: column 5, lines 1-10), $e = N_{shave} - (S_{fml} - S_{int})$.

Regarding claim 32, Reininger discloses accumulating the reduction error, wherein the accumulated reduction error is used in determining the number of bits to shave frame a subsequent portion of the frame (Reininger: column 5, lines 1-10), as in the claim.

Regarding claim 34, Reininger discloses re-determining at least one of the statistics of the given portion, wherein the at least one re-determined statistics about the given portion is used in step (Reininger: column 4, lines 45-67), as in the claim.

Regarding claim 35, Reininger discloses wherein the determined statistics include the compressed content size (Ssize) of the given portion, and the compressed content size is re-determined after the given portion has been requantized.

Regarding claim 36, Reininger discloses determining a requantization parameter for the given portion based at least upon one of the determined statistics about the given portion (Reininger: column 4, lines 25-55), as in the claim.

Regarding claim 42, Reininger discloses determining the picture type of the video frame, wherein the video frame is an MPEG frame, and the group of picture types of I, P, B pictures, wherein the picture type of video frame is used in determining the requantization parameter (Reininger: column 2, lines 35-45; column 3, lines 1-10), as in the claim.

Regarding claim 51, Reininger discloses wherein the given portion of the frame is a slice of the frame having multiple blocks of levels (Reininger: column 2, lines 55-60), and the blocks of levels are thresholded in parallel (Reininger: column 9, lines 5-25), as in the claim.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 12-15, 37-40, and rejected under 35 U.S.C. 103(a) as being unpatentable over Reininger et al., (hereinafter referred to as "Reininger") in view of Seo et al., (hereinafter referred to as "Seo").

Reininger discloses an apparatus in a network for transcoding a digital stream of compressed frames (Reininger: figure 2), the apparatus comprising: a decoder adapted to decompress a video frame having content information and non-content information included therein (Reininger: column 8, lines 20-30) into the DCT-domain (Reininger: column 7, lines 10-20), wherein the content-information carried by the frame is represented as levels in the DCT-domain (Reininger: column 8, lines 45-65); a rate controller adapted to receive the video frame, parse the video frame into a plurality of portions (Reininger: column 8, lines 15-25), determine a plurality of statistics about a given portion (Reininger: column 3, lines 20-25 and 45-67), and determine a target number of bits (N_s) to shave from the given portion (Reininger: column 5, lines 5-15); a requantizer adapted to requantize levels of the given portion (Reininger: column 4, lines 10-15); a thresholder adapted to threshold the given portion (Reininger: column 4, lines 50-67), wherein the rate controller determines whether the given portion should be requantized and whether the given portion should be thresholded based at least in part on at least one of the statistics about the given portion (Reininger: column 4, lines 3-10); and an encoder adapted to compress the frame (Reininger: column 6, lines 25-50), wherein the compressed size of the frame is approximately the same as a target size (Reininger: column 7, lines 10-55), as in claims 12-15. However, Reininger fails to disclose that the requantization parameter is 2 times or 4 times the first quantization parameter so that the compressed content is reduced from a range of 60%-70% or at least 70% as in claims 12-15. Seo discloses a method of selecting a

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requantization in which the requantization parameter is two times or four times the first quantization parameter (Seo: column 5, lines 1-35) so that the compressed content is reduced from a range of 60%-70% or at least 70%, wherein said requantization parameter is generated according to a three zone rate control function (Seo: figure 6A) in order to account for abrupt changes in the bit-rate in the coded bitstream (Seo: column 1, lines 55-60). Accordingly, given this teaching it would have been obvious for one of ordinary skill in the art to incorporate the Seo requantization parameter generating steps into the Reiningner method in order to have the Reiningner method account for abrupt changes in the bit-rate of the coded bitstream. The Reiningner method, now incorporating the Seo requantization parameter generating step, has all of the features of claims 12-15.

Reiningner discloses an apparatus for transcoding a digital stream of compressed frames (Reiningner: figures 3 and 8, the method comprising the steps of: receiving a compressed video frame having content information and non- content information included therein (Reiningner: column 8, lines 20-30); determining the total compressed size of the frame (N_T) (Reiningner: column 3, lines 5-18); determining from at least the total compressed size of the frame the total number of bits (N_S) to shave from the compressed frame (Reiningner: column 5, lines 5-15); determining a plurality of statistics about a given portion of the frame (Reiningner: column 3, lines 20-25 and 45-67); determining whether to requantize the given portion based at least in part upon at least one of the statistics about the given portion (Reiningner; column 4, lines 3-10); responsive to determining to requantize the given portion, requantizing the levels of the given portion (Reiningner: column 4, lines 10-15); determining whether to threshold the given portion based at least in part on the at least one of the statistics about the given portion (Reiningner:

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column 4, lines 16-24); responsive to determining to threshold the given portion, thresholding the levels of the given portion (Reininger: column 4, lines 50-67); and transmitting the given portion (Reininger: column 6, lines 55-60), as in claims 37-40. However, Reininger fails to disclose that the requantization parameter is 2 times or 4 times the first quantization parameter so that the compressed content is reduced from a range of 60%-70% or at least 70% as in claims 12-15. Seo discloses an apparatus for selecting a requantization in which the requantization parameter is two times or four times the first quantization parameter (Seo: column 5, lines 1-35) so that the compressed content is reduced from a range of 60%-70% or at least 70%, wherein said requantization parameter is generated according to a three zone rate control function (Seo: figure 6A) in order to account for abrupt changes in the bit-rate in the coded bitstream (Seo: column 1, lines 55-60). Accordingly, given this teaching it would have been obvious for one of ordinary skill in the art to incorporate the Seo requantization parameter generating means into the Reininger apparatus in order to have the Reininger apparatus to account for abrupt changes in the bit-rate of the coded bitstream. The Reininger apparatus, now incorporating the Seo requantization parameter generating means, has all of the features of claims 37-40.

Allowable Subject Matter

6. Claims 8, 16, 18-25, 33, 41, 43-50 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Oguz discloses efficient scaling of non-scalable MPEG-2 video. Nakajima discloses a method and apparatus of rate conversion for coded video data. Eyuboglu discloses an efficient transcoding device and method. Ye discloses a method for rate distortion optimized data partitioning for video coding using backward adaptation. Saunders discloses a block by block data compression with quantization control.

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Andy S. Rao whose telephone number is (571)-272-7337. The examiner can normally be reached on Monday-Friday 8 hours.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mehrdad Dastouri can be reached on (571)-272-7418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

ANDY RAO
PRIMARY EXAMINER

Andy S. Rao
Primary Examiner
Art Unit 2621

asr